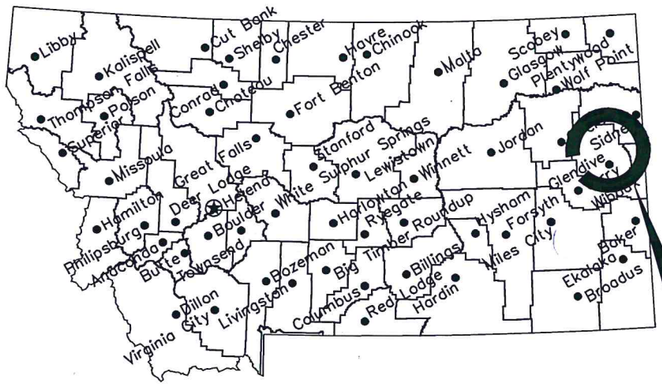
MONTANA FISH, WILDLIFE & PARKS

Elk Island FAS 2019
Boat Ramp & Latrine Replacement

near Savage, Richland County, Montana

FWP Project # 7173737

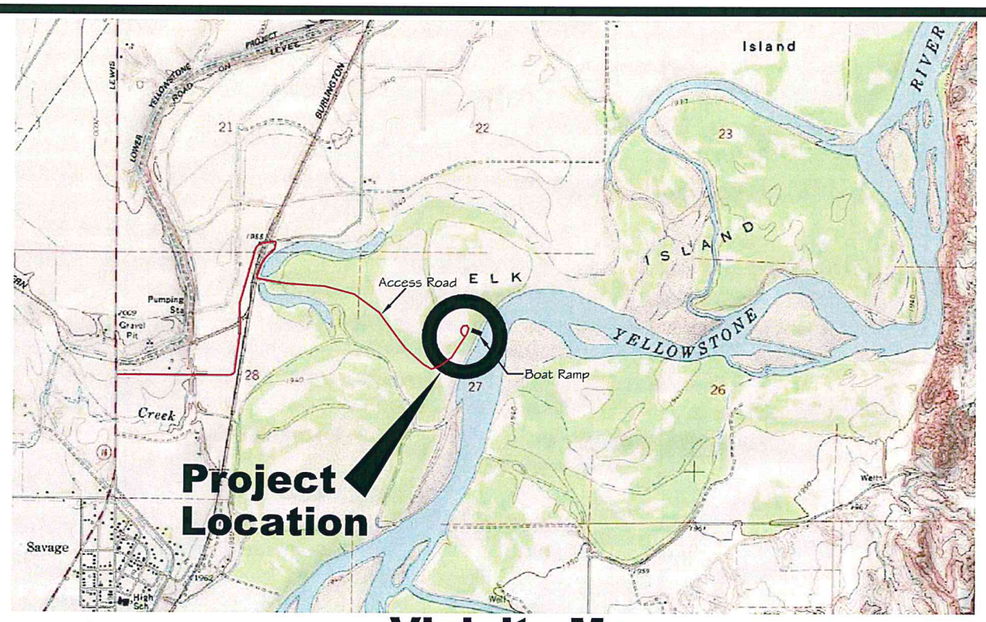


Project Location

Location Map

No Scale

North



Project Location

Vicinity Map

No Scale

MONTANA FISH, WILDLIFE AND PARKS
DESIGN AND CONSTRUCTION

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DRAWING INDEX

MONTANA
PHILLIP N. JAGODA
No. 46100PE
LICENSED PROFESSIONAL ENGINEER
8/19/19

Tom Mannatt May 1, 2019 DRAWN BY: DATE:	APPROVED BY: DATE:	APPROVED BY: DATE:	Montana Fish, Wildlife & Parks
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Cover Sheet
Elk Island FAS- Boat Ramp & Latrine Replacement

SHEET: 1 of 8

NEW BOAT RAMP

Begin Swale Sta 11+60

NEW POST & CABLE BARRIER - SEE SHEET 8

PROPOSED FILL/TOE

EXISTING POST & CABLE BARRIER - TO BE RELOCATED

NEW POST & CABLE BARRIER - SEE SHEET 7

RETAINING WALL - SEE SHEET 7

PROPOSED FILL/TOP/ GRADE BREAK

SURVEY CONTROL POINT (TYPICAL)

INSTALL NEW LATRINE w/ FINISHED FLOOR ELEVATION @ 1954.00 - SEE SHEET 8

NOTE: THE 100 YEAR BASE FLOOD ELEVATION AT THE LATRINE IS 1944.00. THIS VALUE WAS ESTIMATED USING THE 2016 YELLOWSTONE RIVER CORRIDOR STUDY. THIS SITE IS NOT MAPPED BY FEMA.

ACCESS

ROAD

TOP OF BANK

GRADE BREAK

TOP OF BANK

GRADE BREAK

OLD RAMP - REMOVED FALL 2018

END SWALE STA 12+75

WATER LINE ON AUGUST 13, 2018

ORDINARY HIGH WATER LINE ELEVATION 1936

OLD RAMP

RIVER

YELLOWSTONE

Scale:

0 50' 100'

LEGEND

- Barrier Posts
- Existing Fence
- New Concrete Boat Ramp
- 4775 Existing major contour
- 4775 Exiting minor contour
- 4770 Proposed major contour
- 4770 Proposed minor contour
- 4451.50 Proposed Spot Elevation
- CP4 Control Point (typical)
- Drain Rock Swale (sheet 5)

PROJECT QUANTITIES

Earthwork Cut	835 cubic yards
Earthwork Fill	835 cubic yards
Drain Rock Swale	115 lineal feet
Retaining Wall	45 lineal feet
Cast-In-Place Slab	1858 sq.ft.
Push-In Slab	560 sq.ft.
Post & Cable Barrier	144 lineal feet
Crushed Road Base	140 cubic yards

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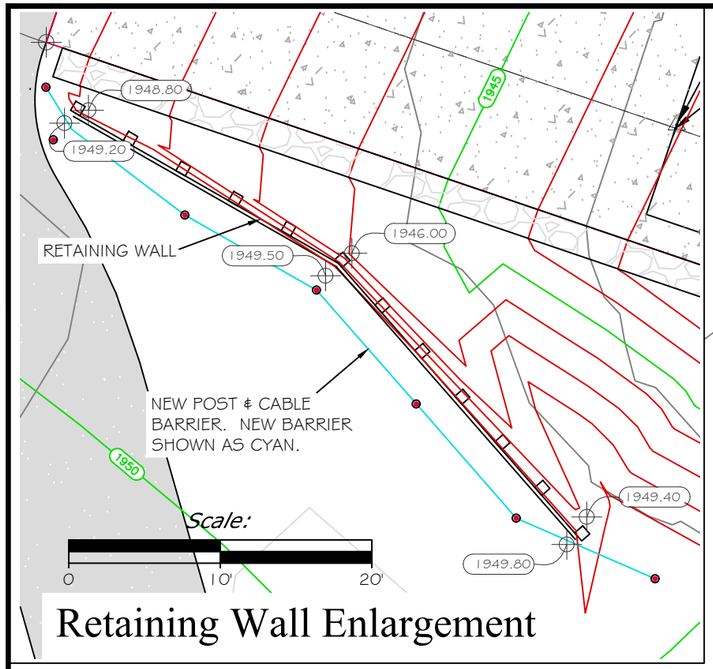
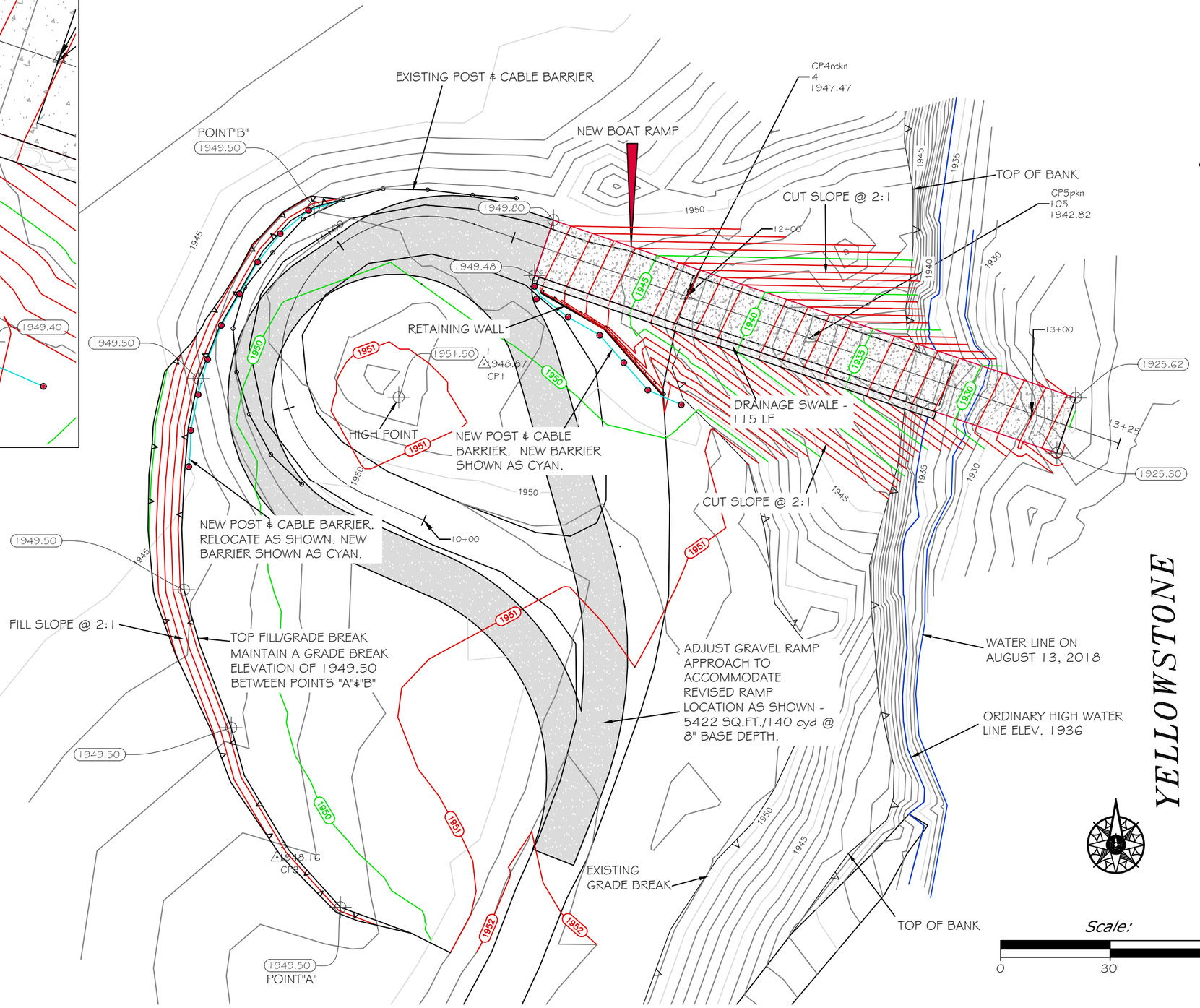
Site Plan

Elk Island FAS- Boat Ramp & Latrine Replacement

SHEET: 2 of 8



Retaining Wall Enlargement



LEGEND

- Barrier Posts
- Existing Fence
- New Concrete Boat Ramp
- 4775 — Existing major contour
- 4775 — Exiting minor contour
- 4770 — Proposed major contour
- 4770 — Proposed minor contour
- 1451.50 — Proposed Spot Elevation
- △ CP4 — Control Point (typical)
- Drain Rock Swale (sheet 5)
- Cottonwood Tree
- Deciduous Tree

PROJECT QUANTITIES

Earthwork Cut	835 cubic yards
Earthwork Fill	835 cubic yards
Drain Rock Swale	115 lineal feet
Retaining Wall	45 lineal feet
Cast-In-Place Slab	1858 sq.ft.
Push-In Slab	560 sq.ft.
Post & Cable Barrier	144 lineal feet
Crushed Road Base	140 cubic yards

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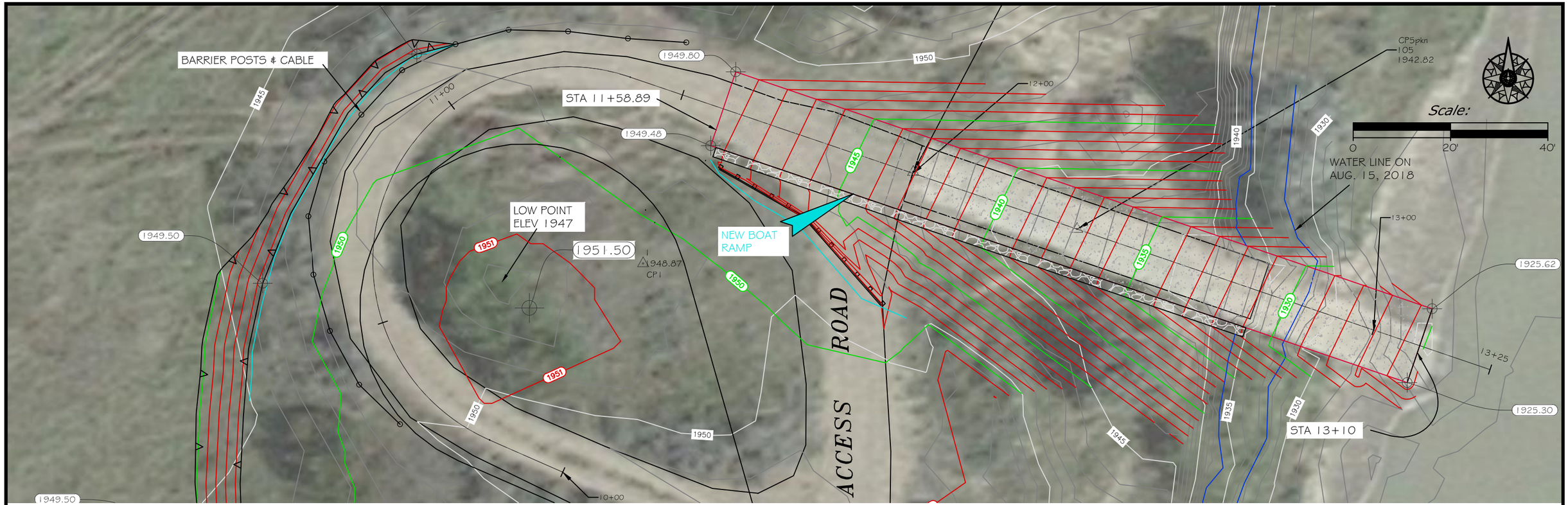
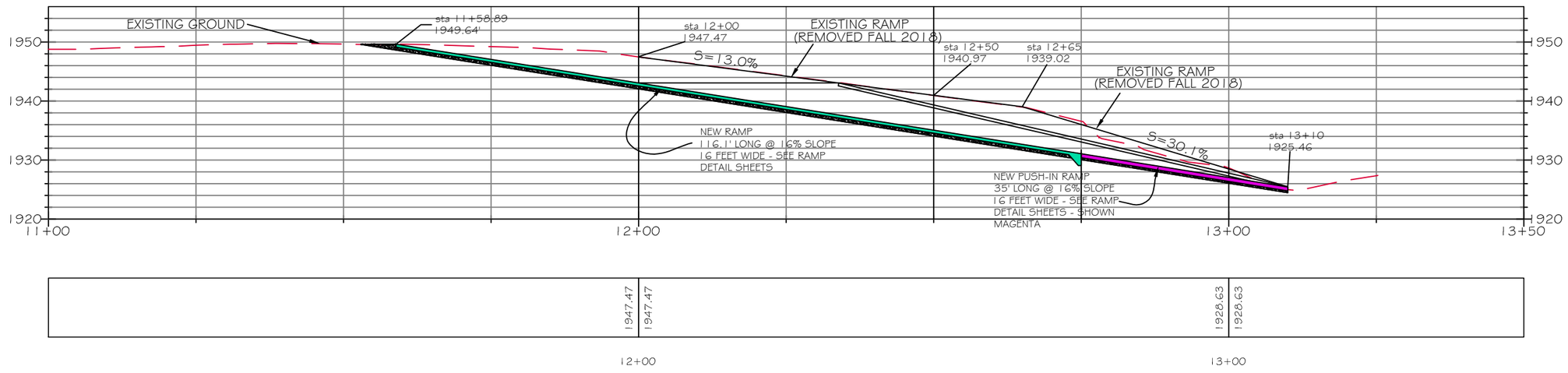
Grading Plan

Elk Island FAS- Boat Ramp & Latrine Replacement

SHEET: 3 of 8



Alignment 1 PROFILE



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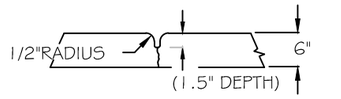
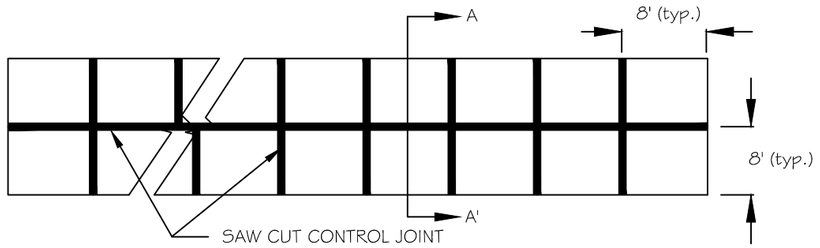
Boat Ramp Plan & Profile

Elk Island FAS- Boat Ramp & Latrine Replacement

SHEET: 4 of 8



CONTRACTION CONTROL JOINT DETAIL

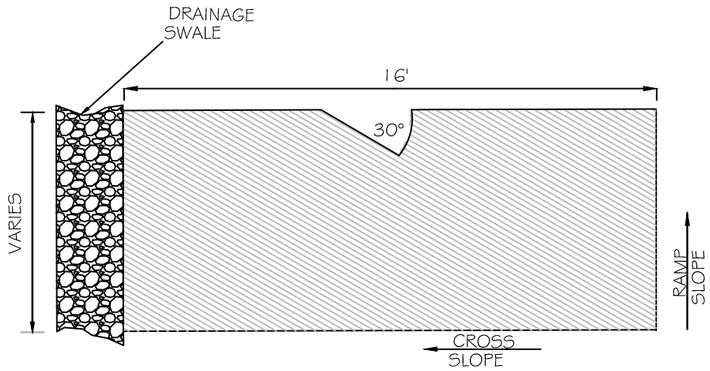


NOTE:

1. CONCRETE FOR NEW RAMP IS A 3/4" MINUS; 6-1/2 SACK MIX WITH A MIN 28 DAY STRENGTH OF 4000 PSI, REINFORCED WITH # 4 BARS @ 12" SPACING BOTH DIRECTIONS.
2. SCREED CONCRETE FOLLOWED BY GROOVING THE SURFACE.
3. SAW CUT CONTRACTION JOINTS AFTER RAMP IS GROOVED.

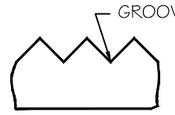
SLAB CONTROL JOINT DETAIL

PLAN VIEW



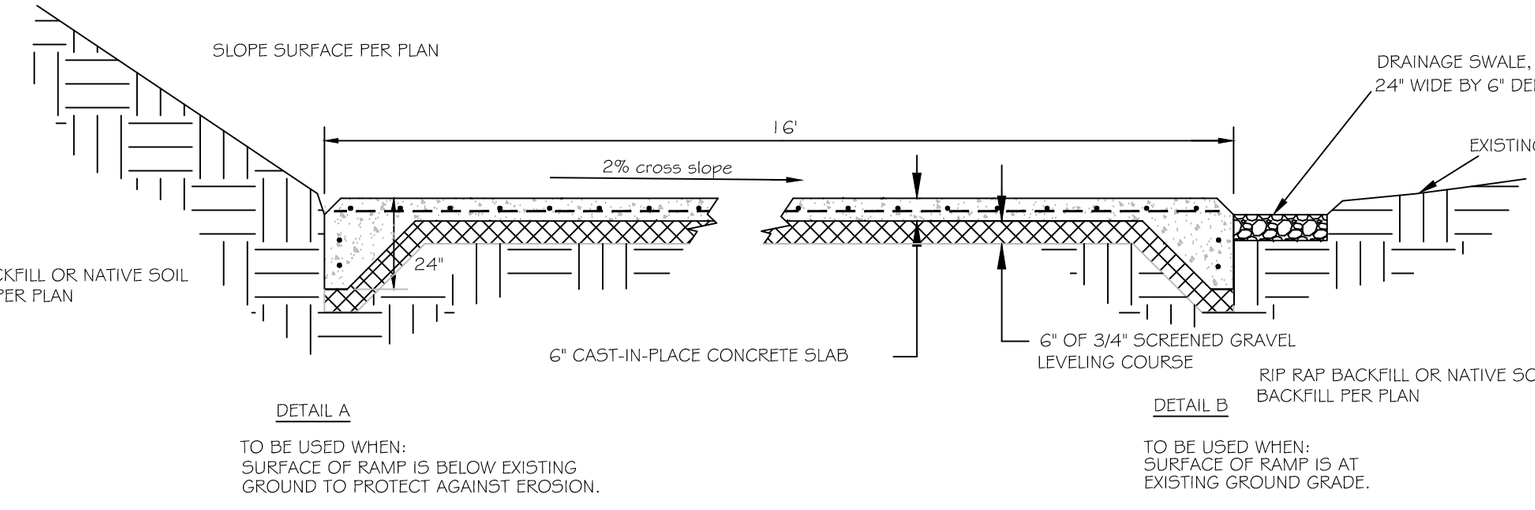
GROOVED SURFACE PLAN

PLAN VIEW



NOTE:

1. MFW&P WILL PROVIDE GROOVING TOOL

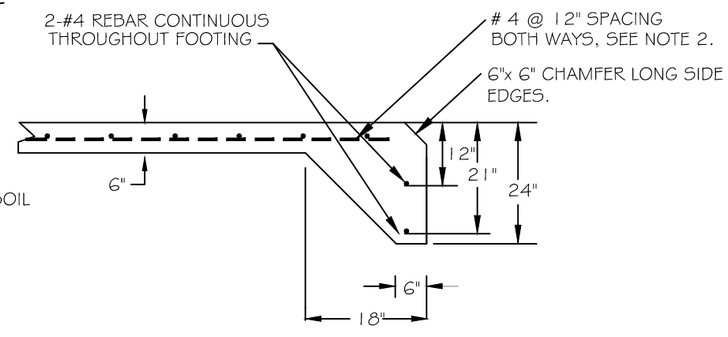


DETAIL A

TO BE USED WHEN:
SURFACE OF RAMP IS BELOW EXISTING GROUND TO PROTECT AGAINST EROSION.

DETAIL B

TO BE USED WHEN:
SURFACE OF RAMP IS AT EXISTING GROUND GRADE.



THICKENED EDGE DETAIL

FOR CAST IN PLACE RAMP

CAST-IN-PLACE CONCRETE

SECTION A-A'

NOTES.

1. CONTINUE THICKENED EDGE FOOTING AROUND ENTIRE PERIMETER OF CAST-IN-PLACE CONCRETE.
2. EXTEND AND EXPOXY #4 BARS MIN 20" (12" O.C.) IN EXISTING CONCRETE CONNECTIONS. PROVIDE EXPANSION JOINT MATERIAL ALONG COLD JOINT CONNECTIONS.
3. NO CHAMFER ALONG SIDEWALK/BULKHEAD/EXISTING CONCRETE CONNECTIONS.
4. PROVIDE 2½" CLEAR COVER FOR ALL REBAR REINFORCEMENT.

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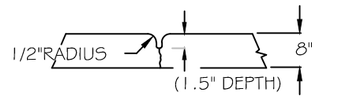
150

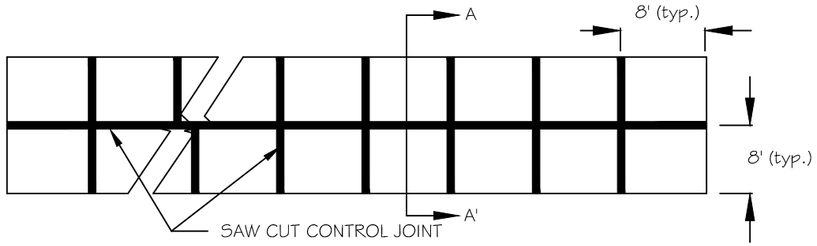
Cast In Place Concrete Boat Ramp Details

Elk Island FAS- Boat Ramp & Latrine Replacement

SHEET: 5 of 8



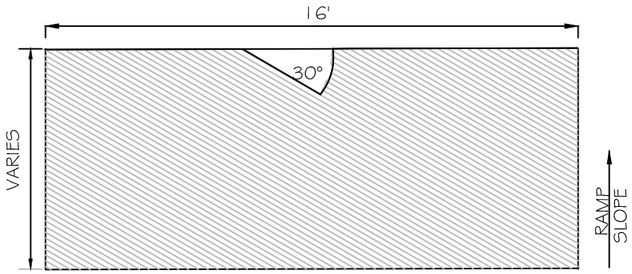
CONTRACTION CONTROL JOINT DETAIL



SLAB CONTROL JOINT DETAIL

NOTE:

1. CONCRETE FOR NEW RAMP IS A 3/4" MINUS; 6-1/2 BAG MIX WITH A MIN 28 DAY STRENGTH OF 4000 PSI.
2. SCREED CONCRETE FOLLOWED BY GROOVING THE SURFACE.
3. SAW CUT CONTRACTION JOINTS AFTER RAMP IS GROOVED.



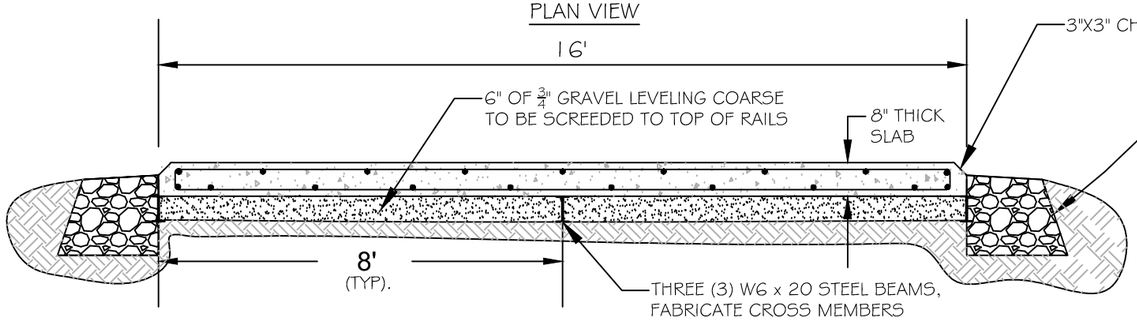
GROOVED SURFACE PLAN

PLAN VIEW

NOTE:

1. MFW&P WILL PROVIDE GROOVING TOOL

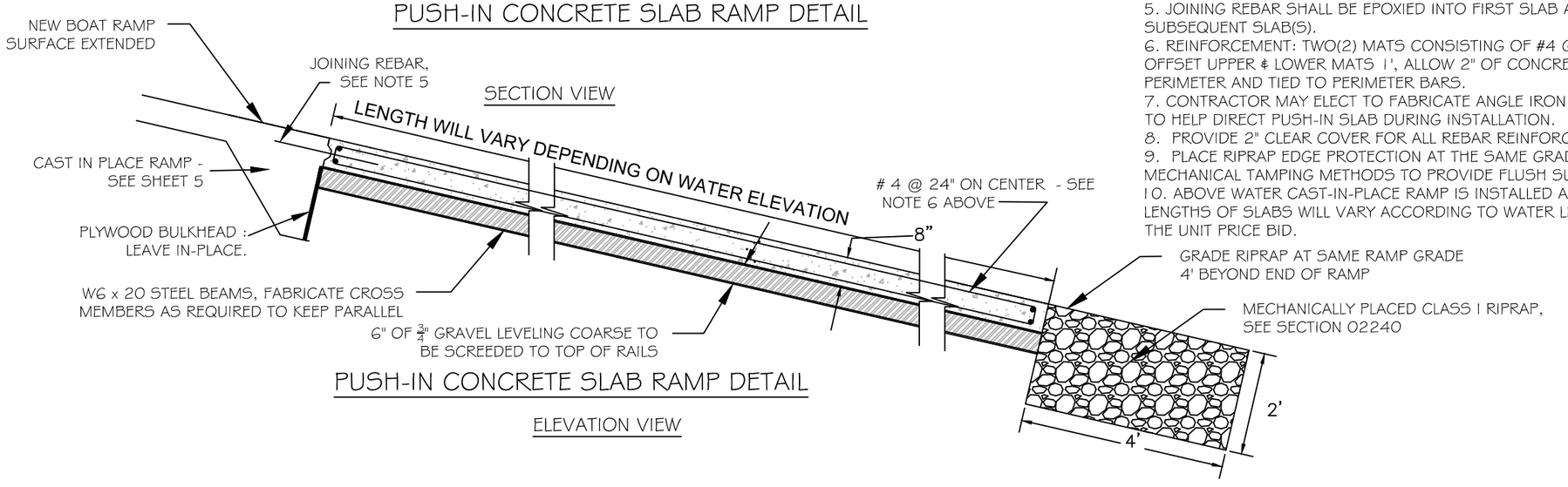
PLAN VIEW



PUSH-IN CONCRETE SLAB RAMP DETAIL

NOTES:

1. ALL PUSH-IN SLAB SECTIONS ARE TO BE CAST AT APPROXIMATELY THE SAME SLOPE AS THEY ARE TO BE PLACED.
2. ALL PUSH-IN SECTIONS SHALL BE ALLOWED TO CURE FOR MINIMUM OF 14 DAYS.
3. ALL PUSH-IN SECTIONS SHALL BE CAST ON A SMOOTH 6" LAYER OF COMPACTED GRAVEL.
4. DEPENDING ON CONSTRUCTION EQUIPMENT OR WORKING AREA LIMITATIONS, CONTRACTOR MAY HAVE TO MAKE MULTIPLE PUSH-IN SLAB POURS PRIOR TO FINAL INSTALLATION. ALL SEPARATE POURS WILL REQUIRE REBAR PLACEMENT AS DESCRIBED IN NOTE 5.
5. JOINING REBAR SHALL BE EPOXIED INTO FIRST SLAB AND EXTENDED A MINIMUM OF 20" INTO SUBSEQUENT SLAB(S).
6. REINFORCEMENT: TWO(2) MATS CONSISTING OF #4 GRADE 40 REBAR 2' ON CENTER EACH WAY, OFFSET UPPER & LOWER MATS 1', ALLOW 2" OF CONCRETE COVER, EACH BAR SHALL HAVE A 4" HOOK AT PERIMETER AND TIED TO PERIMETER BARS.
7. CONTRACTOR MAY ELECT TO FABRICATE ANGLE IRON ALONG EDGE OF OUTER STEEL SUPPORT BEAMS TO HELP DIRECT PUSH-IN SLAB DURING INSTALLATION.
8. PROVIDE 2" CLEAR COVER FOR ALL REBAR REINFORCEMENT.
9. PLACE RIPRAP EDGE PROTECTION AT THE SAME GRADE OF PUSH-IN SLAB. KEY IN RIPRAP BY MECHANICAL TAMPING METHODS TO PROVIDE FLUSH SURFACE.
10. ABOVE WATER CAST-IN-PLACE RAMP IS INSTALLED AFTER BELOW WATER PUSH-IN SECTION IS PLACED. LENGTHS OF SLABS WILL VARY ACCORDING TO WATER LEVELS AND COMPENSATION WILL BE BASED ON THE UNIT PRICE BID.



PUSH-IN CONCRETE SLAB RAMP DETAIL

ELEVATION VIEW

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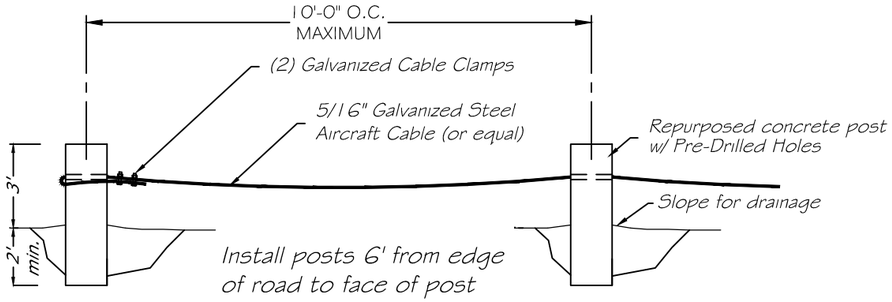
Push In Slab Concrete Boat Ramp Details

Elk Island FAS- Boat Ramp & Latrine Replacement

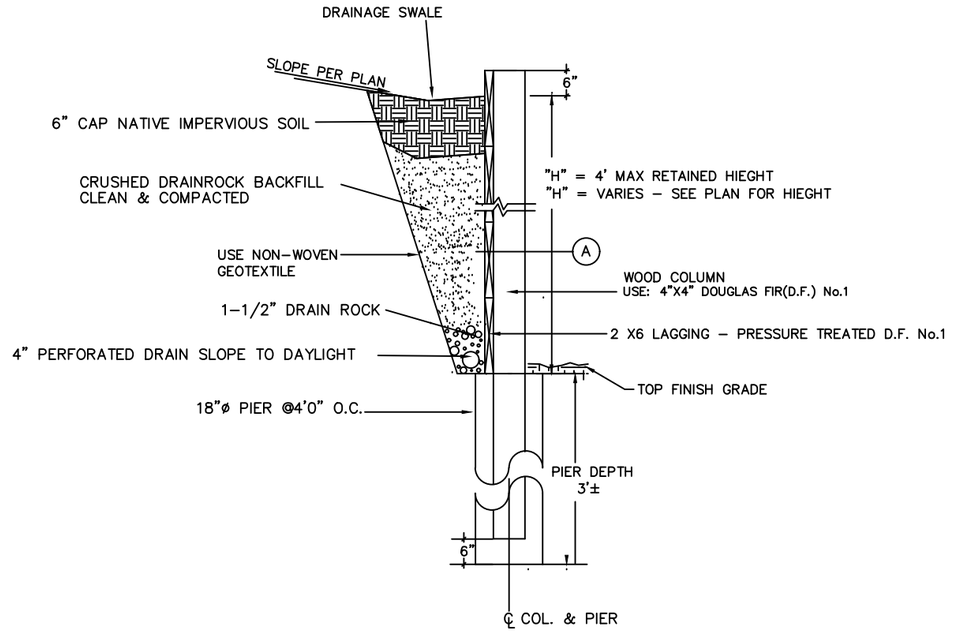
SHEET: 6 of 8

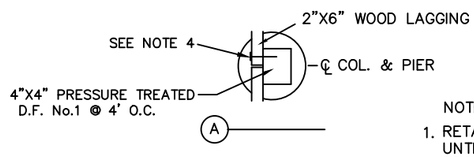


NOTES:
1. Ensure posts are plumb and true. Tamp soil tight to maintain position.
2. Pull cable tight enough to minimize deflection without pulling posts from plumb position.
3. Use cadmium plated or galvanized steel for all cable clamps, bolts, nuts & washers.

BARRIER POST AND CABLE DETAIL

(Not to Scale)





NOTES:
1. RETAINING WALL SHALL NOT BE BACKFILLED UNTIL CONCRETE HAS REACHED ITS 28 DAY DESIGN STRENGTH (14 DAYS MINIMUM).
2. DRILLED HOLES SHALL BE CLEAR OF ALL DEBRIS PRIOR TO POURING CONCRETE.
3. CONCRETE SHALL BE M–3000 WITH 3000 PSI COMPRESSIVE STRENGTH PER MPWSS
4. FASTEN WOOD LAGGING TO COLUMNS WITH 16d GALVANIZED NAILS IF NEEDED.

WOOD RETAINING WALL DETAIL

(Not to Scale)

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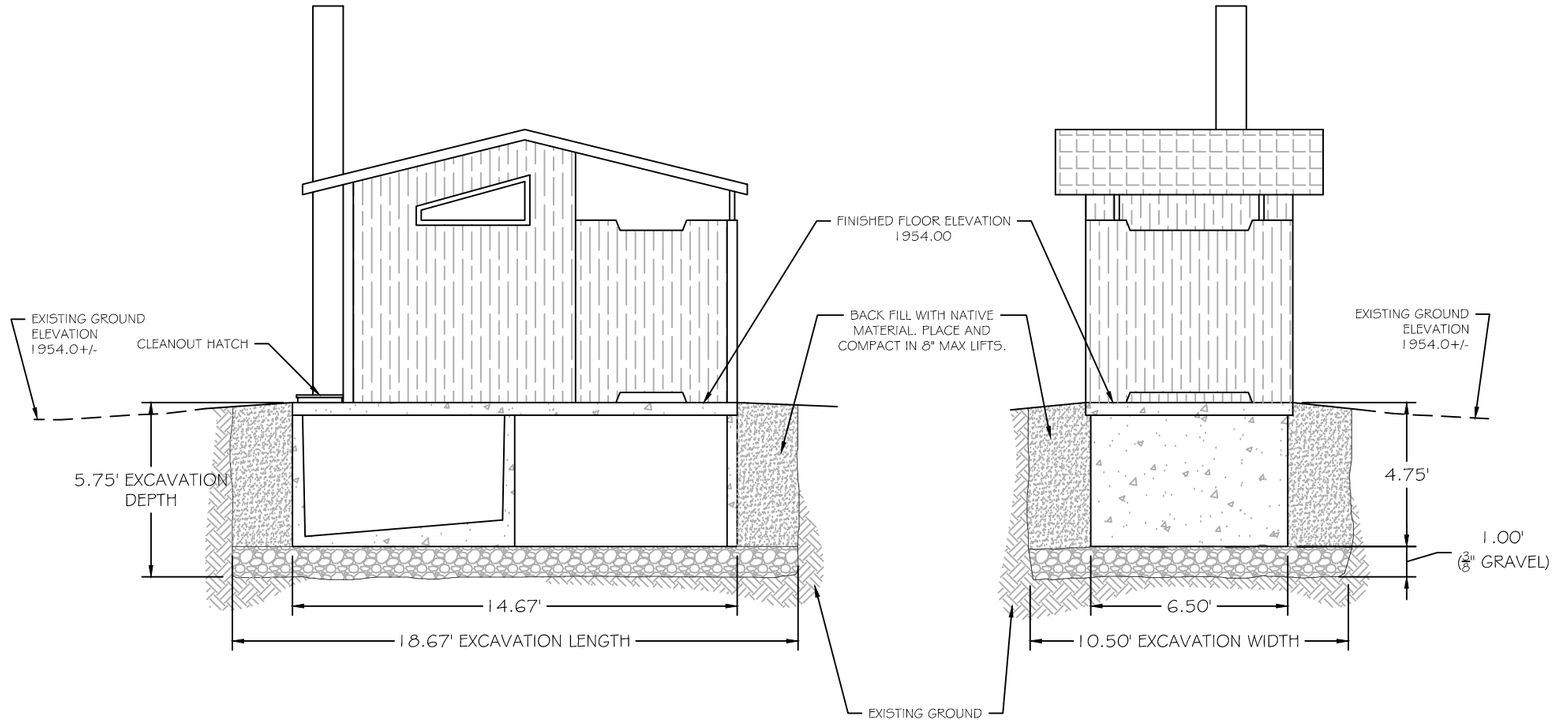

GENERAL

THE LATRINE WILL BE PURCHASED AND DELIVERED TO THE SITE BY OWNER.

INSTALLATION

GENERAL INSTALLATION INVOLVES EXCAVATION, LEVELING BOTTOM OF HOLE WITH DRAIN AGGREGATE, INSTALLING LATRINE, BACKFILLING AROUND LATRINE AND LANDSCAPING.

EXCAVATION

A. EXCAVATE SUBSOIL TO A POINT 12 INCHES DEEPER THAN REQUIRED FOR LATRINE INSTALLATION.
   1. DEPTH OF EXCAVATION IS 5.75' FOR THE PRECAST LATRINES MANUFACTURED BY MISSOULA CONCRETE.
   2. FINISH FLOOR ELEVATION IS SHOWN ON THE SITE PLAN.
B. MINIMIZE OVER EXCAVATION. STOCKPILE EXCAVATED MATERIAL FOR LATER BACKFILLING AND LANDSCAPING.
C. COMPACT BOTTOM OF HOLE WITH THREE PASSES OF WHACKER OR SKID PLATE COMPACTION DEVICE.

LEVELING

A. USE SMALL GRAVEL, 3/8 INCH MINUS CRUSHED OR SCREENED GRAVEL, AND PLACE ENOUGH IN BOTTOM OF HOLE SUCH THAT WHEN COMPACTED, IT WILL BE 12 INCHES DEEP.
B. COMPACT LEVELING MATERIAL WITH THREE PASSES OF COMPACTION DEVICE.
C. LEVEL BASE FOR INSTALLATION OF LATRINE.
D. INSTALL LATRINE FINISHED FLOOR AT AN ELEVATION OF 1954.00.

LATRINE INSTALLATION

A. THE PRECAST LATRINE WILL BE SET BY THE SUPPLIER.
B. INSURE THAT LATRINE SITS LEVEL AND PLUMB WHEN DONE INSTALLING.

BACKFILLING

A. PLACE IN SUCCESSIVE 8 INCH LAYERS MATERIAL PREVIOUSLY EXCAVATED FROM HOLE AND COMPACT.
   1. REMOVE ROCKS LARGER THAN 6 INCHES IN DIAMETER FROM THE FILL.
   2. REMOVE BRANCHES, ROOTS AND OTHER OR ORGANIC DEBRIS IN FILL.

LANDSCAPING

A. SLOPE GRADE AWAY FROM LATRINE.
B. BLEND FILL SLOPE INTO SURROUNDING TERRAIN.
C. REMOVE SURPLUS FILL MATERIAL.
D. REMOVE SOIL TO A DEPTH OF 2 INCHES BENEATH LOCATION FOR ENTRANCE SLAB AND COMPACT.
E. PLACE TWO INCHES OF 3/4 INCH PEA GRAVEL FOR BEDDING, LEVEL AND COMPACT.

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Typical Latrine Installation

Elk Island FAS- Boat Ramp & Latrine Replacement

SHEET: 8 of 8